Social determinants, health and healthcare outcomes

2017 Intermountain Healthcare Annual Research Meeting

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“Adversity is not randomly distributed: instead it tends to cluster and to accumulate present on top of past disadvantage”

David Blane, MSc MD
Social determinants of health

• People with a higher standard of living have better health outcomes (Marmot, 2006)

• The majority of health is driven by non-care delivery factors – genetic, social, environmental, behavioral

• Conditions in the places where people live, learn, work and play affect a wide range of health risks and outcomes (CDC, 2015)

• No agreed-upon measurement methods have been adopted (Knighton, 2016; Phillips 2016)
Intermediary vs structural determinants

**Intermediary determinants of health - immediate**

- Material circumstances (including access to care)
- Behaviors and biologic factors
- Psychosocial factors

**Structural determinants of health - upstream**

- Neighborhood living conditions
- Opportunities for learning and capacity for development
- Employment opportunities and community development
- Prevailing norms, customs and processes
- Social cohesion, civic engagement, and collective efficacy
- Health promotion, disease prevention and healthcare opportunities

World Health Organization
What is the Singh Area Deprivation Index (ADI)?

Geographic, area-based measure of the relative average socio-economic position of a particular neighborhood.

Factor and principal components analysis used to develop and validate index by Singh for the United States (2003).

Index based upon 17 census measures in four categories linked to all-cause US mortality: income, living conditions, employment and education.

Developed at the census block group level for the state of Utah (Knighton et al, 2016).

Patient assigned an ADI score (Mean: 100; Range -40 to 150) based upon the census block group they live in.
Profiling disparities by quintile

<table>
<thead>
<tr>
<th>Census Indicator</th>
<th>Q1</th>
<th>Q5</th>
<th>Observed odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median family income, $</td>
<td>$105,000</td>
<td>$42,000</td>
<td>0.4</td>
</tr>
<tr>
<td>Population below 150% poverty level, %</td>
<td>11.2%</td>
<td>39.8%</td>
<td>3.6</td>
</tr>
<tr>
<td>Single parent household, %</td>
<td>5.6%</td>
<td>13.0%</td>
<td>2.3</td>
</tr>
<tr>
<td>Owner-occupied housing, %</td>
<td>83.0%</td>
<td>53.8%</td>
<td>0.6</td>
</tr>
<tr>
<td>More than 1 person per room, %</td>
<td>1.4%</td>
<td>6.4%</td>
<td>4.6</td>
</tr>
<tr>
<td>Median home value, $</td>
<td>$383,380</td>
<td>$126,620</td>
<td>0.3</td>
</tr>
<tr>
<td>Unemployment rate, %</td>
<td>5.5%</td>
<td>10.4%</td>
<td>1.9</td>
</tr>
<tr>
<td>High school graduation rate, %</td>
<td>97.1%</td>
<td>81.9%</td>
<td>0.8</td>
</tr>
<tr>
<td>&lt;9th grade education, %</td>
<td>0.8%</td>
<td>7.0%</td>
<td>8.8</td>
</tr>
</tbody>
</table>

Knighton et al., 2016
What does an ADI measure?

• Estimates the combined effect of both individual and neighborhood deprivation exposures (both compositional + contextual effects)

• Strong causal link between individual socio-economic status and the neighborhood we live in (Cutrona, 2006; Cierda, 2010; Bikdeli, 2014)

• Neighborhood-level contextual exposures have an independent effect on health (Bikdeli, 2014; Chi, 2016)

• High degree of persistence in neighborhood deprivation exposure over time despite mobility (Solon, 1999; Kunz, 2001; Van Ham, 2014; Vartanian, 2007; Knighton, 2017)
Case Study – Do social determinants predict higher levels of subsequent utilization in already high-utilizing patients?

Goal – Stratification of patients with increased risk of future utilization

Opportunity - Better stratification could support identification of patients and interventions designed to address effects

Study Population: 5158 adult patients identified as high-cost in 2014 given classification in the top 10% in the prior year and top 15% two of last three years.

Excluded costs for deceased patients, transplant costs, chemo, dialysis therapy and orthopedic replacements.
Adjustment factors include age, sex, ethnicity, race, marital status, Charlson comorbidity score, Medicaid payer status (*p<.05)
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ED VISITS PER HIGH-UTILIZING PATIENT

Adjustment factors include age, sex, ethnicity, race, marital status, Charlson comorbidity score, Medicaid payer status (*p<.05)
Case Study – What role does community play?

Neighborhood material deprivation ➔ Social isolation ➔ Patient Outcome

−

Patient-reported faith identification or urban residence ➔ Social isolation ➔ Patient Outcome
EFFECT MODIFICATION OF RELIGIOUS IDENTIFICATION ON HF PATIENT 30-DAY MORTALITY

Adjusted Odds of 30-Day Mortality

2.57

OR 0.35 (95% CI: 0.14-0.87); p=.03

Bottom 90%  Top 10%

0.94  0.84

Neighborhood Material Deprivation

Self-reported no faith identification

Self-reported no faith identification

(n=6065)
EFFECT MODIFICATION OF RURAL RESIDENCE ON HF PATIENT 30-DAY MORTALITY

Adjusted Odds of 30-Day Mortality

- OR 0.29 (95% CI: 0.09-0.98); p=.05

Bottom 90%  Top 10%

Neighborhood Material Deprivation

- Rural residence
- Urban residence

(n=6065)
Case Study – Collaborating for health in pre-natal and post-natal care

Goal – Nurse-based home visits for a high-risk expectant mother can significantly improve the life course for both the mother and child

Opportunity – Collaboration between IH and Salt Lake County Department of Health (SLCDH) developed to increase IH patient participation

Approach –

• Use clinical judgment supported by risk stratification to better identify those most likely to benefit from program engagement
• Patient invitation and warm referral provided by the clinical team
• Patient feedback shared between IH clinical team and SLCDH nurse
Performance Baseline – Patient invitations to participate

- 5 - Most Deprived
- 4
- 3
- 2
- 1 - Least Deprived
Risk stratification and prediction

Initial Criteria
- First pregnancy
- Low income

Revised Criteria
- First pregnancy
- <29 weeks gestation
- >12 weeks gestation
- Any patient living in a neighborhood with ADI quintile=5
- Any patient on Medicaid living in neighborhoods with an ADI of 3-5
Introduction into the clinical workflow

NFP Referral Clinical Workflow

Referral Process

Patient

Call Center/Scheduling

Obstetrician/Gynecologist (OB/GYN) Nurse Team

Practice Director

Institute for Healthcare Improvement Research

Start

Patient calls to schedule an appointment

Call template completed

Yes

No

Screening call template

Possibly NFP eligible?

Provide copy of completed screening call template

Additional information included in patient evaluation

Scheduled at 8 weeks

Segmented results into a data file including (OMR), current address, age, payer type sent weekly

Generate ACO score for each patient and identify those meeting identified criteria

NFP eligible

Identify address

Update listing of external patients

Referred patients report

Stop

First scheduled visit at 10-13 weeks

NFP eligible

Final open visits

Stop
Preliminary results

- Introduction of a warm referral into the OB/GYN visit is a natural extension of the clinical workflow
- Observed enrollment rates are higher in communities using a warm handoff
- Observing an increase in the percentage of patients referred from more deprived neighborhoods

Evaluating generalizability of collaborative approach within the pediatric asthma clinical program
Summary

• ADI provides a low-cost, accessible measure of relative patient socio-economic position

• ADI appears useful in risk stratification and prediction
  • Focus has been on its effects within the delivery system
  • Measure can support assessment of structural determinants as we look “upstream”

• Identification of vulnerable patients can guide the use of scarce resources to tailor interventions to improve outcomes
References


